



The Future of School Buses

A Case Study on Electric Fleet Conversion

Orange Unified School District (USD) plans to use funding to electrify its large fleet with Accelera-powered Blue Bird electric school buses at a reduced cost. Orange USD Director of Transportation Christina Celeste-Russo and Transportation Supervisor Omar Dena explain how.



Key Take-Aways



Districts can stay ahead of state emission regulations for a fraction of the cost using abundant funding opportunities for electric, zero-emission school buses and make-ready programs for charging infrastructure.



Large fleet electrification is viable, attainable and beneficial for drivers, students and community members.



School bus electrification is the future. Orange USD currently operates a fleet of 15 electric school buses and advocates for other school districts to transition to electric.



Background

Increasing environmental challenges have proven sustainable transportation solutions are essential. One area where significant progress can be made is in the electrification of school bus fleets. The South Coast Air Quality Management District requires school districts to purchase cleaner-fueled buses whenever old diesel buses are retired to meet certain emissions regulations. Orange USD's vehicles in southern California are subject to these emission regulations. The district currently operates 15 Accelera-powered Blue Bird electric buses and has applied for funding for an additional 16. To prepare for the implementation of new emissions regulations, the Orange USD transportation department made the bold decision to replace 31 diesel buses from their 119-bus fleet by 2025.





Securing Funding

Orange USD has acquired electric vehicles (EVs) at a reduced cost thanks to grant and funding programs. See chart below. Christina Celeste-Russo, Orange USD Director of Transportation, will continue to utilize funding opportunities to convert the district’s diesel buses at a lowered upfront cost.

Timeline	Awarded Late 2020	Awarded 2022	Awarded 2022	Applied, results to come January 2024
Buses Received	7	2	6	16
Funding Program	Volkswagen (VW) Environmental Mitigation Trust	South Coast Air Quality Management District’s Incentive Program (SCAQMD) + HVIP	Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)	Volkswagen (VW) Environmental Mitigation Trust
Funding Description	The Volkswagen (VW) Mitigation Trust was established to fully mitigate the diesel NOx emissions caused by VW’s illegal actions.	The SCAQMD program provides an incentive to buy down the cost of residential chargers by offering rebates towards the purchase of a qualified residential Level 2 EV charging station.	Through the California Air Resources Board, HVIP provides vouchers to eligible fleets for electric, hybrid or natural gas trucks and buses to reduce costs at the time of purchase.	The Volkswagen (VW) Mitigation Trust was established to fully mitigate the diesel NOx emissions caused by VW’s illegal actions.

Infrastructure



The Orange USD transportation department took a strategic approach to setting up charging infrastructure. The district was awarded a grant through the Southern California Edison Charge Ready Transport Program (SCE CRT) for electric infrastructure which allowed them to acquire 15 Level 2 AC charging stations. Celeste-Russo emphasized that this program simplified the electrification process and saved the district approximately \$750,000 on infrastructure and installation expenses. The district is currently in phase two of infrastructure updates and will obtain an additional 16 charging stations, including 13 Level 2 AC and 3 Level 3 DC fast chargers to support the electrification of their remaining diesel buses.

Proven Performance

Orange USD's routes average 90 miles and include city streets, canyons and hills. The electric buses have proven highly reliable and perform well in heavy rain and extreme heat.

"The electric buses respond quickly to acceleration and drive well on flat roadways as well as hills. They are smooth and extremely quiet on the road. The buses also have a good regenerative braking system, which helps recharge the batteries when driven downhill. They're easy to control on steep inclines."

Omar Dena
Transportation Supervisor



Making the Switch to EVs

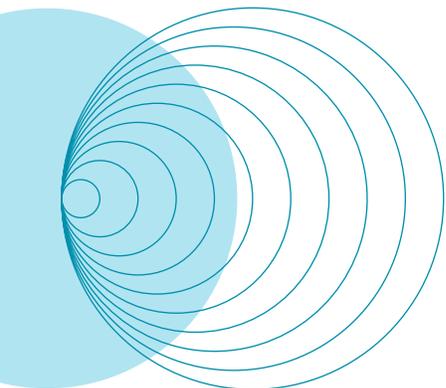
Implementation

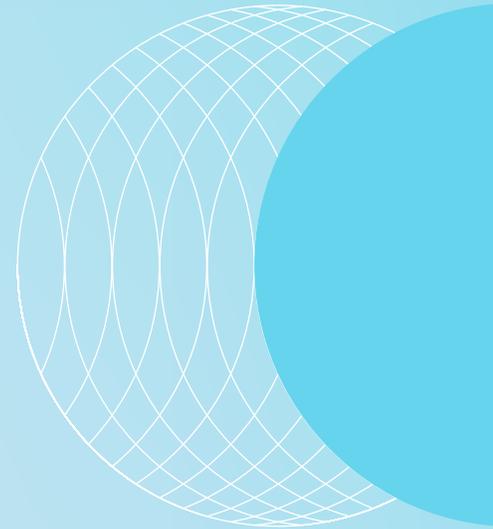
The Orange USD transportation department examined the extent of the buses' capabilities on their routes, including performance on different terrains and battery range. They adapted procedures, operations and regulations based on their experience, including an important rule implemented by Celeste-Russo that says drivers may not leave the depot unless their vehicles have a minimum 50% battery charge. This ensures the buses don't run out of charge while on their routes.

The department's driver training also required changes. In addition to standardized training from the school district, Orange USD drivers received specialized EV training from both the district and their bus dealer.

The buses boast unique features such as regenerative braking, which automatically slows down the bus as soon as the driver releases the accelerator and simultaneously replenishes the batteries. Additionally, the buses have electric creep, enabling drivers to maneuver the vehicle at lower speeds without constantly pressing the accelerator. The training helped drivers adjust to the differences in pre-trip inspection procedures, the driving dynamics of electric power and braking techniques.

Omar Dena, Transportation Supervisor at Orange USD, stresses the importance of driver training for successful EV bus implementation and recommends that other districts prioritize it. The Orange USD transportation department's adaptations led to a smooth transition to electric and helped the district prepare for continued bus electrification.





“The savings that we see with the electric buses allow us to reinvest back into the district, whether that’s additional zero-emission vehicles or expanded infrastructure. It allows us to provide our students a cleaner and safer environment.”

Christina Celeste-Russo
Director of Transportation

Cost Savings

Celeste-Russo estimates the district spends about 22 cents per mile to charge the electric buses, compared to over one dollar per mile to fuel diesel buses. The reduced fuel costs and significant savings from the near-maintenance-free batteries and EV drivetrain have resulted in substantial savings for the district.

All-around Benefits

Celeste-Russo and Dena shared that students and community members alike commented on the quiet, clean ride of the electric buses. Students and drivers love the comfort, and board members are excited and proud of the investment and future of the transportation department.

Reflection



While electrifying over 30 buses is ambitious, Orange USD's experience with Accelera-powered Blue Bird electric buses has been positive. This school district is an excellent example of how to make the most of all available incentives. Dena is excited about plans for electrification and believes the EV buses are ideal for home-to-school transportation.

Strategic planning, abundant funding opportunities and a commitment to driver training and safety successfully kept Orange USD ahead of emission regulations and paved the way for further fleet electrification. The district's use of grant funding for buses and infrastructure has reduced upfront costs while providing long-term operational savings and positive health and environmental impacts.

"At the end of the day, there is a huge benefit to the students, community and district as a whole to convert fleets and go clean."

Christina Celeste-Russo
Director of Transportation

accelerazero.com
blue-bird.com